Built with Google Cloud: Gain Real-Time Insights From Encrypted Data

Unlock insights and drive profits for financial services with PostgresBC

OmniIndex   **Google** Cloud   White Paper

Challenges

Solutions

Securing the path to compliance with Web3 data storage and encrypted analytics

PostgresBC enables users to drive profit and optimize their business operations by adding valuable data to Google Cloud without compromising governance or compliance requirements.

This is possible because OmniIndex has built the world's only commercial decentralized data platform enabling analytics and data visualizations to be performed on fully encrypted data.

Use Case: Utilizing Innovative Technology to Maximize the Security and Profitability of Financial Data

The financial sector has struggled to capitalize on its vast pools of customer information due to strict data regulations.

While there are a number of components to consider around compliance, one of the biggest issues preventing valuable financial data from being added to the cloud is third-party access to decrypted data.

This is a problem because data has to be exposed to multiple parties in order for insights to be generated. This includes employees across multiple departments, and Google.

This White Paper shows how OmniIndex's decentralized data storage and fully homomorphic encryption (FHE) enables financial organizations to gain real-time insights from encrypted data in Google Cloud without risking third-party access or exposure.

Considerations & Tradeoffs

PostgresBC uses blockchain for its data storage because of the many security and privacy benefits this technology offers. However, there were a number of issues to overcome to ensure this new and emerging technology could be adopted by enterprise.

1: Data Governance

Blockchains are generally seen as 'Public Trust' entities and these do not work for the financial sector because of data privacy concerns.

To overcome this, OmniIndex created a hybrid model ensuring the 'trust' aspect is held within the customer's architecture while the distributed storage is held either publicly or privately as chosen by the customer. Data ownership is fully under the customer's control with the blockchain able to be held in any geographical region or jurisdiction needed in order to comply with sovereignty requirements.

2: Data Migration

As blockchain is a new and emerging technology, there are also concerns about the time and cost of data migration.

To overcome this, OmniIndex's blockchain storage is built to SQL 2016 specification and is available on the Google Marketplace as a SAAS model. This means data can be easily exported to set requirements and analytics can be performed in Google's productivity, analytics and AI tools without retraining.

As a SAAS model, PostgresBC is also incredibly easy to implement with Google Cloud's trusted services and security ensuring its seamless use.

3: The 51% Attack.

Our architecture is designed to ensure no external actor or actors can gain unauthorized access on any scale. This is done by separating our API from the blockchain:

- The API holds the logic, encryption capabilities, block checks, and blockchain authenticity.
- The nodes hold the blockchain storage.

The nodes are placed on multiple networks, thus lessening a single attack vector, while the API is placed behind a corporate firewall ensuring the protection of a corporate network.

This means even if the API's were attacked, the ability to overpower a blockchain network and change any stored data is not possible.

OmniIndex   **Google** Cloud

Secure, Fast & Simple Insights from Fully Encrypted Data

Secure!

PostgresBC is the only commercial blockchain data platform enabling analytics of fully encrypted data. This technology is protected by an international patent in 'secure database searching' and ensures user's data is never exposed as it remains encrypted at rest, in transit, and in use.

The encrypted data is stored in the user's own blockchain with the blockchain stored either on Google Cloud, or another location of the customer's choosing. Crucially, only the user is able to decrypt that data – not OmniIndex nor Google.

Two key security and privacy benefits of OmniIndex's blockchain data storage are that it ensures no unauthorized access to the data, and that all stored data is immutable. This means neither OmniIndex nor any other third-party is able to access data without permission, and that nobody is able to edit the data.

What's more, each user's data is 'sandboxed' into their own chain with any customer data then also sandboxed. This means it is impossible for one user within an organization to accidentally or deliberately access another's data with each attempt automatically validated and checked.

Finally, because the data is decentralized and stored across multiple nodes instead of being in one location, data is not lost if there is a corruption or issue with one of those nodes because the others will automatically reshare the data to secure the network once more.

PostgresBC's unique combination of blockchain and FHE technology ensures the threat of ransomware attacks is eliminated. This is because an attacker cannot access the data unless they have been given permission, and the immutable data cannot be encrypted with an attacker's own encryption.

OmniIndex   **Google** Cloud
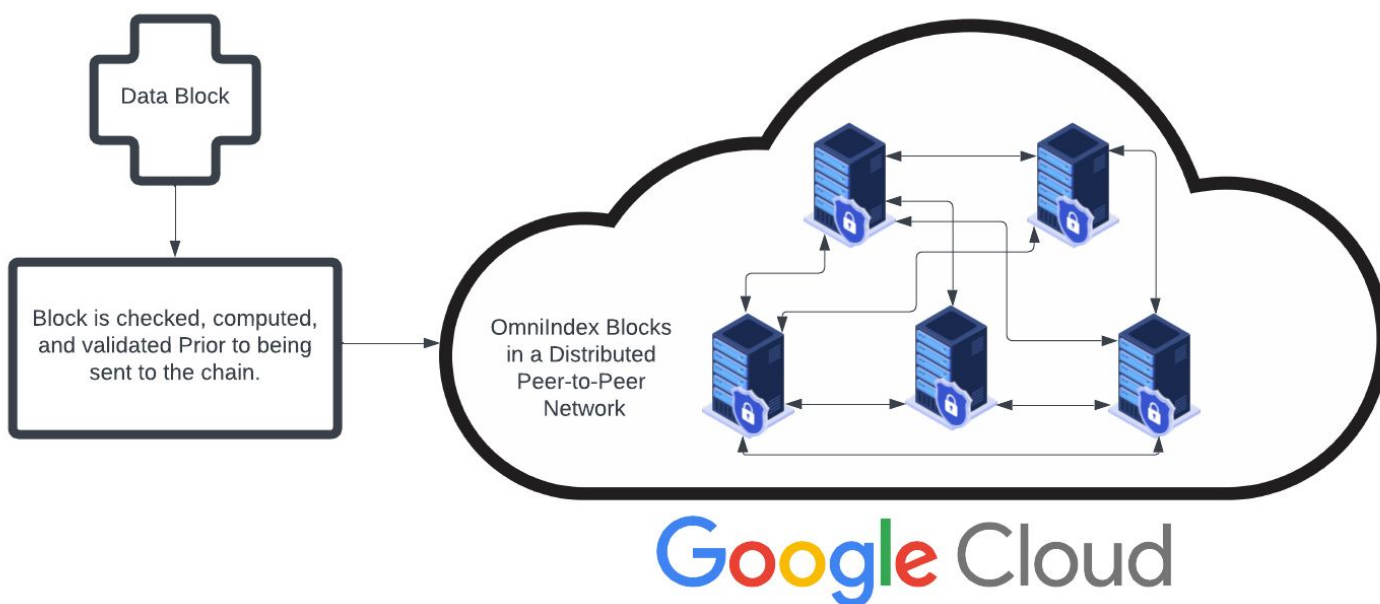
Fast!

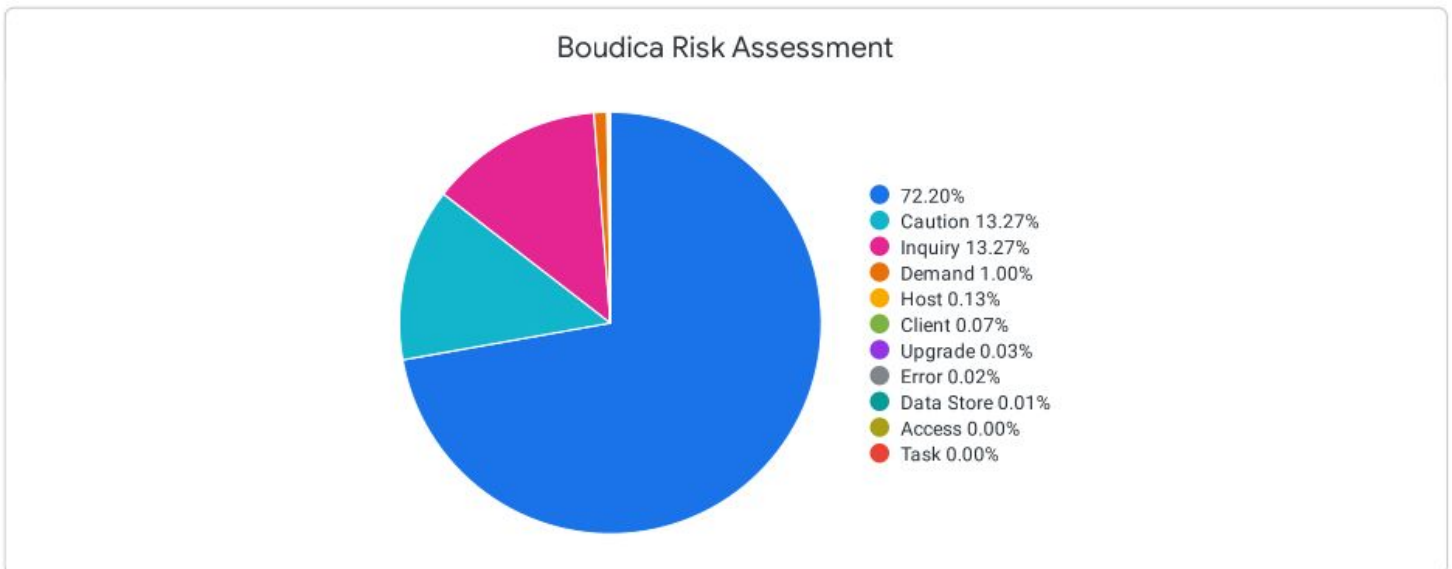PostgresBC can provide real-time insights on fully encrypted data from within the blockchain.

For example, an AI risk assessment of our in-house logs holding over 1.5 million encrypted records pulling back 200,000 rows can be done in under 400 milliseconds.

The query scans the encrypted data and categorizes it into 3 separate pots based on the encrypted data's contents and decrypts the records before outputting the results in a JSON format.

This is a standard report within PostgresBC, enabling users to securely and quickly access system log data in order to understand what current threat vectors are and where the system needs hardening. And, as can be seen from the 'messageencrypt' key in the following query, all log data is automatically encrypted to prevent unauthorized access:

"SELECT pgbc.search_block_data('SELECT messageencrypt, ai_1, ai_1a, ai_2 FROM .seednode_syslog WHERE LENGTH(ai_1a) > 1 AND LENGTH (ai_2) > 1 LIMIT 200000;');"

{"results" : [
   {"ai_1" : " Demand","ai_1a" : " Host","ai_2" : " Technological","messageencrypt" : "Starting GCE Workload Certificate refresh..."},
   {"ai_1" : " Demand","ai_1a" : " Error","ai_2" : " Reputational","messageencrypt" : "20240119 02:06:08: Error getting config status workload certificates may not be configured: HTTP 404"},

Boudica Risk Assessment

- 72.20%
- Caution 13.27%
- Inquiry 13.27%
- Demand 1.00%
- Host 0.13%
- Client 0.07%
- Upgrade 0.03%
- Error 0.02%
- Data Store 0.01%
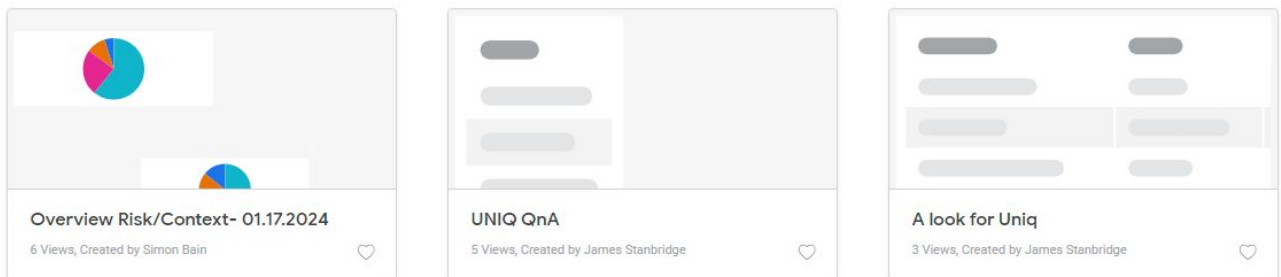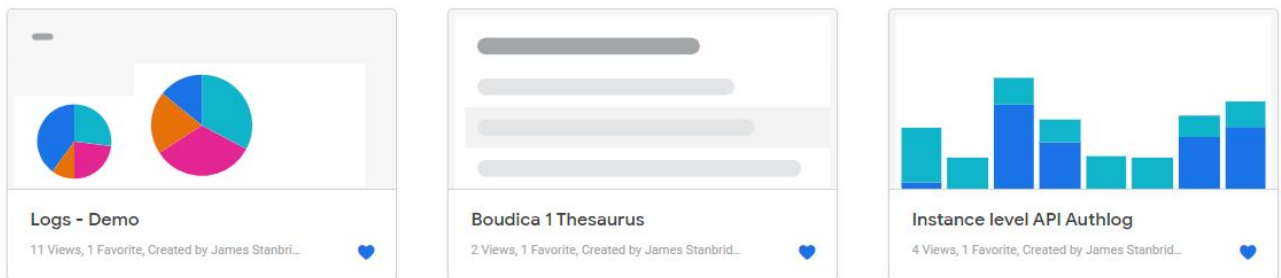- Access 0.00%
- Task 0.00%

Simple!

PostgresBC connects easily to all Google tools via the admin panel and database connections.

Users gain the full functionality of these tools and the seamless collaboration and productivity workflow they are used to, while gaining the security and speed of PostgresBC's blockchain storage and analytics of encrypted data.
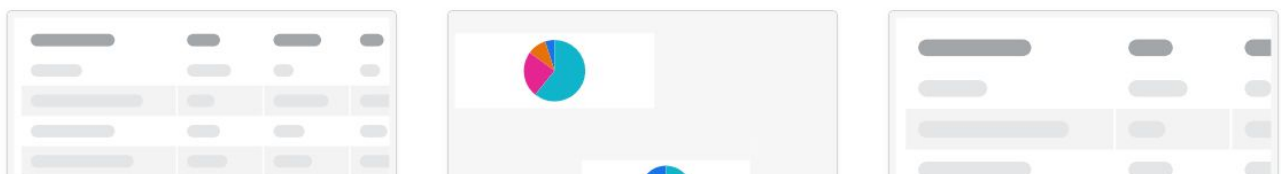
OmniIndex   Google Cloud

Looker

A user can utilize the entire feature set of Looker to manage and gain insights from their encrypted data without risk of exposure or third-party access. Including:
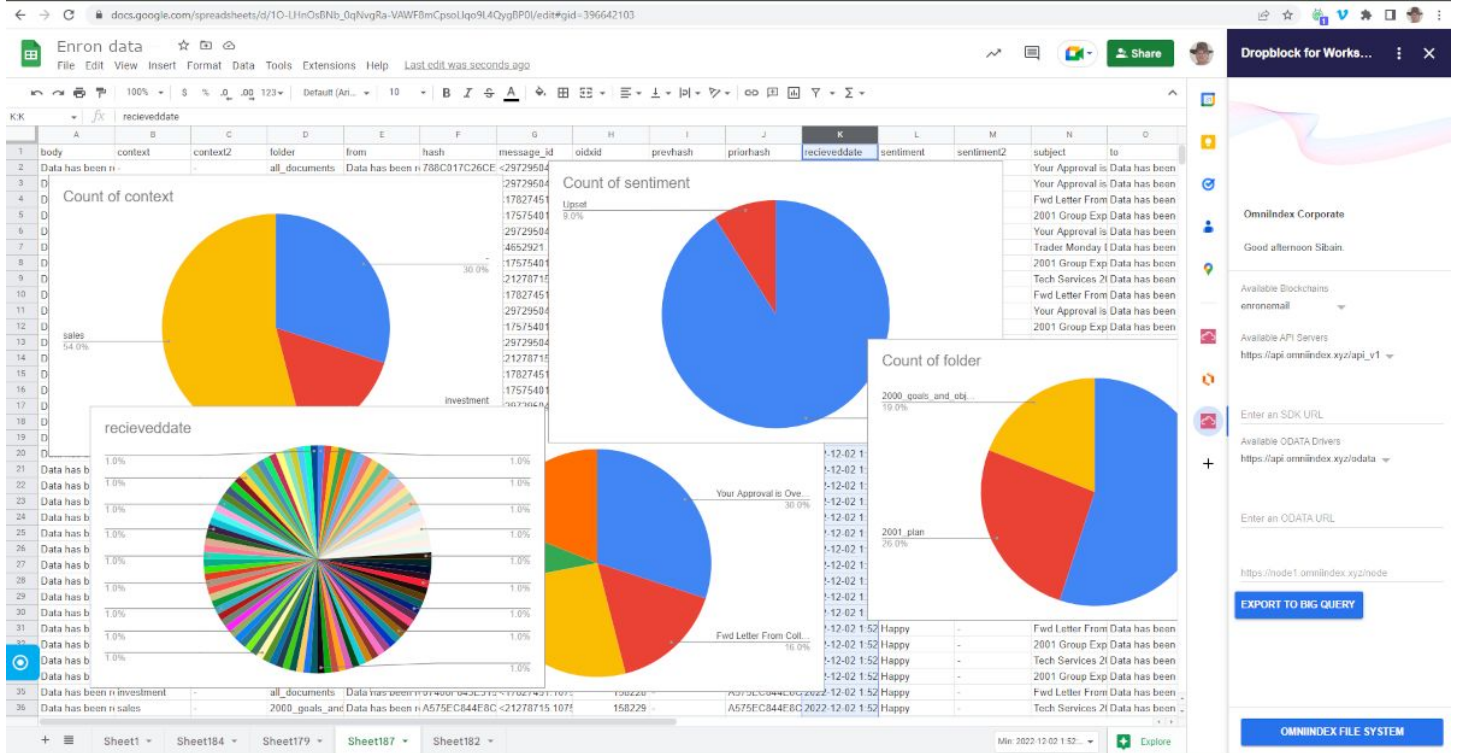
- Build and export encrypted data for further deep data science with Python, R, Prolog etc
- Build and export encrypted data models for BigQuery
- Create alerts on real-time encrypted data thresholds

Logs - Demo
11 Views, 1 Favorite, Created by James Stanbri...

Boudica 1 Thesaurus
2 Views, 1 Favorite, Created by James Stanbrid...

Instance level API Authlog
4 Views, 1 Favorite, Created by James Stanbrid...

Overview Risk/Context- 01.17.2024
6 Views, Created by Simon Bain

UNIQ QnA
5 Views, Created by James Stanbridge

A look for Uniq
3 Views, Created by James Stanbridge

Recently viewed at your organization

Group: Everyon

Future X Logs
11 Views, 1 Favorite, Created by James Stanbri...

Instance level API Authlog
4 Views, 1 Favorite, Created by James Stanbrid...

Logs - Demo
11 Views, 1 Favorite, Created by James Stanbri...

BigQuery

A user can add their PostgresBC data to BigQuery to run SQL queries against their fully encrypted data in a number of ways.

The quickest option is to use OmniIndex's Dropblock extension for Google Workspace which offers both an easy connection to the PostgresBC decentralized file storage, and adds further OmniIndex functions to Workspace.

To do this, a user simply opens the Dropblock extension in Sheets and chooses the 'Data/Export to BigQuery' option. This opens a query editor where they can run an SQL query against their fully encrypted data.

Once they click the 'Run' button, the OmniIndex API is called and data is exported to BigQuery. A table is then made with the blocks' schematic automatically loaded prior to the data being inserted.

Private AI and ML

PostgresBC also offers additional insights through its native Small Language Model (SLM) AI, and Machine Learning (ML).

PostgresBC's native AI, Boudica, does not require extensive training and can instead be adapted to instantly offer specialist insights by adding new ontologies. Potential areas include adding additional languages, tailoring analytic queries to a specific industry, and identifying threats.

For example, one of the most popular default options is 'Global Corporate Risk'. This can be used to automatically check the fully encrypted data in real-time for any term or chain of words that might indicate a compliance risk or suggest suspicious activity.

These insights are automatically generated in real-time and can be accessed via PostgresBC's built-in AI chatbot. The chatbot can also be used for closed model bias interference, dynamic SLM learning, and ML analytics.

The in-database ML is powered by PostgresML and enables solutions including:

- The ability to run models directly on your existing data to avoid costly data movement and latency issues, resulting in faster predictions and insights.
- The ability to leverage the power of SQL to train and deploy models using familiar SQL commands, making it easily accessible for data analysts and DBAs without requiring specialized ML expertise.
- The ability to streamline your analytics pipeline by keeping everything within the database, reducing complexity and integration headaches.

PostgresML also prioritizes efficient and optimized resource management & operation. Including:

- Fewer network calls: By running within the database, PostgresML eliminates the need for constant communication with external services, lowering network overhead and latency.
- Simple, high-availability infrastructure: Leverage existing PostgreSQL replication and failover mechanisms, minimizing configuration complexity and infrastructure costs.
- Instant scalability: Easily scale your ML capabilities by adding more PostgreSQL nodes to your cluster, seamlessly extending your processing power.
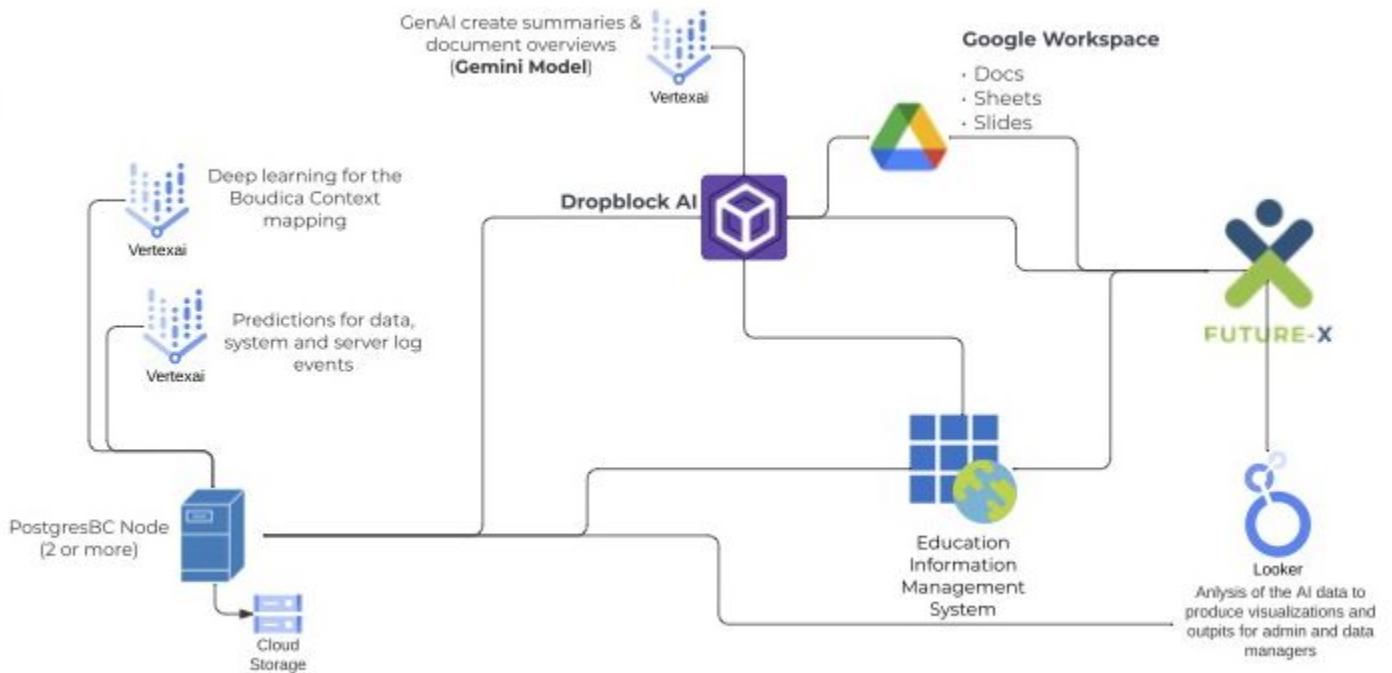
Customer Architecture Diagram

Future-X Education are one of OmniIndex's largest customers. They use the PostgresBC data platform to securely store the educational data of students and teachers in Nigeria and analyze that fully encrypted data with Google Looker and Gemini AI as well as OmniIndex's AI and ML.

They are subject to strict data regulations and compliance requirements and require the complete encryption and Web3 security that many finance institutions also require.

This diagram shows data stored within PostgresBC with integrations to:

- Google Workspace (Via Dropblock - the OmniIndex Add-on for Workspace)
- Vertex AI Gemini Model
- Vertex AI Deep Learning
- Vertex AI Training
- Looker Analytics

OmniIndex   **Google** Cloud

By adding their data to Google's productivity and analytics tools with PostgresBC, our financial customers are able to use Google Cloud to gain actionable real-time insights to drive profits and improve security without compromising governance or compliance requirements.

For example, they are able to perform real-time AI analytics on their encrypted data round the clock to identify patterns and anomalies in the data to reveal any potential fraud. As the data remains encrypted throughout, the insights can be generated without the sensitive and confidential information ever being exposed.

PostgresBC enables customers to add a new pool of data to Google's industry-leading analytics and productivity tools to gain insights and drive profit while staying compliant with regulations and data security rules.

PostgresBC is available on the Google Marketplace and there is a free Developer Platform available enabling a single user to test out the OmniIndex and Google solution today.

Google Cloud
Partner

Please get in touch to learn more about the OmniIndex Web3 cloud solutions.

www.omniindex.io
info@omniindex.io
+1 (650) 297-4682